

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

**The Impact of Environment on Climate Change Action**

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**Executive Summary**

Our study explored the effect of one's immediate environment on their likelihood of engaging in pro-environmental behaviour. Specifically we survey participants in three different locations across UBC Vancouver campus, two of these locations were defined as urban (one indoor and one outdoor), and one was defined as natural. When comparing the results from all three conditions there was no significant effect on petition signing behaviour. However, we did find a significant effect on petition signing between our indoor urban and natural environment. We hypothesise that the lack of an effect found at our outdoor urban condition may be due to the fact that it wasn't perceived as urban by participants. Overall our research suggests that environmental context may influence one's likelihood on engaging in pro-environmental behaviours, however, more research is needed to confirm or deny this, as well as to uncover the mechanisms by which this may work. Based on our results we suggest that people canvassing for petition signatures for environmental issues do so in a natural environment such as a park to increase efficiency.

## Introduction

With the effects of climate change becoming more apparent, finding ways to increase people's likelihood to engage in environmentally sustainable behaviour is now more important than ever. In testing the validity and reliability of their Connectedness to Nature Scale (CNS), Mayer & Frantz (2004) found a connection between feeling more emotionally connected to nature and engaging in pro-environmental behaviours in five studies. This finding was corroborated by Gosling & William (2010) who found that among farmers, connectedness to nature is related to conservation behaviour. In their study on the benefits of nature, Mayer, Frantz, Bruehlman-Senecal & Dolliver (2009) found that though emotional connection to nature was a largely internal belief, it could also be influenced by the environment someone is in. In their 3 studies, they consistently found that participants in the natural environments, whether it be actual or virtual, felt more emotionally connected to nature than those in the urban environments.

Our motivations for our study comes from the lack of research on the influence of real life natural environments on pro-environmental behaviours. Most studies exploring the role of nature on pro-environmental behaviours use virtually simulated environments instead of direct exposure to nature and it has yielded mixed results (Zelenski, Dolopski, & Capaldi 2015; Klein & Hilbig, 2018). This discrepancy could be due to virtual nature having weaker effects on the individual psyche, as compared to direct exposure to nature, especially in regards to connectedness to nature (Mayer & Frantz, 2004). As such it would be important to investigate the influence of direct exposure to nature on pro-environmental behaviour since prior research suggest that acting in pro-environmental ways can be influenced by one's environment (Wu, DiGiacomo, & Kingstone, 2003). Thus the research question we want to explore is how does environmental context affects people's willingness to take action on climate change. We hypothesize that being in a natural environment, as opposed to an urban setting, will increase people's likelihood to engage in pro-environmental behaviours such as sign a petition for climate change.

## Methods

### *Participants*

The participants in our study were obtained through convenience sampling at three varying locations at The University of British Columbia Vancouver campus. We sampled anyone who we in the designated areas irrespective of their affiliation with UBC. Overall we surveyed 154 people across all conditions ( $N = 154$ ). Within each condition we acquired the following numbers of participants; Triumph park ( $n = 51$ ), UBC Life building ( $n = 51$ ), and UBC fountain ( $n = 52$ ). The demographics of our participants varied. In terms of gender there were 81 females, 65 males, one person who identified as non-binary, and one who preferred not to say (Appendix, figure A). Therefore, females were slightly more represented in our study, however, due to the fact the UBC has more female students than males this was expected (UBC, 2018). Participants mean age was 23.530 ( $SD = 8.910$ ). Participants included 130 students, five staff members, three faculty members,

11 visitors, and five residents (Appendix, figure B). For those of our participants who were students; 36 were in year one, 27 in year two, 27 in year three, 26 in year four, and 9 in year five or above (Appendix, figure C).

### *Conditions*

This study had three conditions consisting of one natural condition and two urban conditions. We operationalized “natural” as a place predominantly surrounded by trees, grass, and natural characteristics, largely void of concrete, buildings or other major human interventions. The natural condition was Triumph park, a green space on campus. Our definition of “urban” was a place predominantly surrounded by concrete, buildings, and major human interventions, largely void of trees, grass, and natural characteristics. These definitions are consistent with other studies which compared the affective and cognitive impacts of natural versus urban environments (Mayer et al., 2009; Berman, Jonides, Kaplan, 2008). We chose two urban conditions as we wanted to explore the possible mediating effect of whether participants were indoors or outdoors. We did not believe there could be an indoor condition that could sufficiently fit our criteria for “natural” environment therefore we did not include an indoor natural counterpart in our study. Our indoor urban condition was the UBC Life building, and our outdoor urban was the UBC fountain. These conditions met our criteria as they are both busy areas predominantly surrounded by concrete. We added a measure in our survey asking participants to rate how natural their immediate environment was in order to confirm whether our conditions are perceived in the context we have positioned them in our study.

### *Measures*

Our primary focus was measuring the effects of the independent variable on the dependant variable. Our independent variable was the participant’s immediate environment. The dependant variable assessed was whether or not they signed the petition. Petition signing has high mobility, making it an ideal pro-environmental behavior to test in different environments. For this we used a petition titled “Save Vancouver Island’s Old-Growth Rainforest” (Appendix, figure D). We had participants actually sign the petition versus indicating that they would sign a petition as prior research demonstrates that intended behavior does not always translate to actual behavior (Bamberg, 2002). In addition we measured a variety of other variables that we believed could be possible confounds or could have mediating effects on our results (Appendix, figure E). The following were our secondary measures: (1) How natural would you rate your immediate environment? (Not UBC as a whole), (2) how peaceful would you rate your immediate environment? (Not UBC as a whole), (3) how environmentally sustainable would you rate your day to day behaviours?, and (4) how much do you care about environmental initiatives?

We measured these variables with a likert type scale with a range of 0-5, thus avoiding the possibility of participants responding “neutral” to our questions. We included the question asking participants about their perception of how natural their immediate environment was in order to confirm that we chose conditions were viewed as natural or urban not only by us but also by those in question. The question on peacefulness was included as this is the measure that is most

predominant in prior research therefore it may act as a confound. The last two questions gave us an indication on whether individuals in any condition were inherently more sustainably minded than those in another condition. As we used self selection we wanted to confirm that participants found in the environmental condition were not significantly different on these measures than participants in the urban conditions. Additionally, we asked participants how much impact they believed climate change had on the environment, however these results had to be omitted due to the low response rate accrued. Additionally, participants were asked if they had previously signed petitions before, these answers were measured as yes' or no's. Additional affiliative variables and demographic measures including age, gender, affiliation with UBC, departments (if applicable), and student year (if applicable) were also obtained.

### *Procedure*

In order to obtain a sample we approached participants present in our locations of interest. Participants self selected their location, however, we do not believe this to be an issue as during real petition canvassing this is the case. In such our experiment can be classified as Quasi-experimental. Upon approaching participants we asked them if they would be willing to take part in a five minute survey. If they said yes, participants were passed a laptop with the survey open and the participant code already inputted. The survey began with the standard notice of consent. If participants decided to continue they then would answer the questions outlined earlier. When the survey was finished participants were notified on screen that they were done. After they handed back the laptop we asked them if they would be interested in signing a petition for a climate change issue, being careful to not push it upon them or be forceful in any way. If they said yes we handed them a print out of the petition including a write up about the issue and a space for them to sign. Upon completion we would thank participants and note their participant code on the top of the petition page.

### **Results**

To test of primary hypothesis a chi-square was performed to determine whether the three conditions had an influence on the likelihood of people signing a petition for a climate change issue. The results were insignificant,  $X^2(2, N = 154) = 4.089, p = .129$  (Appendix, figure F). However, for exploratory purposes when we ran the chi square again only including condition one (Life building) and three (Triumpf) and this yielded significant results,  $X^2(2, N = 102) = 3.903, p = .048$  (Appendix, figure G).

We ran a one way anova to examine the effect on one's environment on participants ratings of how natural they viewed that location to be. The results show a statistically significant difference in ratings of naturalness between conditions,  $F(2,150) = 15.310, p = <.001$ . A post-hoc test revealed that participants perceived Triumpf park to be more natural than the Life building,  $t(2) = -5.479, p = <.001$  (Appendix, figure H). A one way anova was conducted to compare the effect of one's environment on the relative perception of "peacefulness" respondents associated with that environment. The results show a statistically significant difference in ratings of peacefulness between

the conditions,  $F(2,146) = 4.538, p = .012$ . The post-hoc test indicated that the significance exists between conditions one (Life building) and three (Triumpf park),  $t(2) = -2.904, p = .009$  (Appendix, figure I). This demonstrates that participants found Triumpf park to be significantly more “peaceful” than the Life building. Differences between the other conditions were not significant. An anova testing the effect of one’s environment on their reported sustainable behaviours was statistically insignificant,  $F(2,149) = 3.588, p = .030$  (Appendix, figure J). Similarly, an anova exploring the effects of one’s environment on their level they care about environmental initiatives also yielded statistically insignificant results,  $F(2,150) = 1.919, p = .150$  (Appendix, figure K). We found no significant correlation with petition signing for our measurements of age ( $r = .121, p = .139$ ) nor gender ( $r = -.170, p = .035$ ). There was a statistically significant but very small correlation between petition signing and prior experience with petition signing ( $r = .217, p = .007$ ).

## Discussion

As explained in the results section, the analysis of our primary measure was insignificant when all three conditions were included, however, once the fountain condition was removed the results between the Life building and Triumpf park were revealed to be significant. This exploratory result suggests that there may be a relationship in which being in a natural environment increases people's willingness to sign a petition regarding a climate change issue. We believe this may be a function of the validity of our conditions, specifically the UBC fountain. In our test when asked to rate how natural their current environment was on a 0-5 scale in order to determine if our chosen conditions were perceived as natural or urban by our participants, and therefore see if they were salient. While the rating for the Life building and Triumpf park were rated as expected, the ratings for the UBC fountain fell in the middle of our 0-5 scale, ( $M = 2.788$ ) (Appendix, figure L). While we believed the fountain would be perceived as an urban environment, it was actually perceived somewhere between urban and natural, making it a poor measure of people’s behaviours in a natural environment. Therefore, as the exploratory research demonstrates there was an effect when using the two appropriate conditions for natural and urban this suggest that being in a natural context may increase people’s likelihood to take action on climate change. However, more research is needed to validate or disprove this claim, as this result was purely exploratory. In addition, further research is needed to determine the mechanisms of this effect as this is unclear based on our results. Since this effect was only found between the natural and indoor urban condition the effect could be due to being outside versus inside. Similarly, since we found an statistical significance indicating that Triumpf was viewed as the most peaceful condition it could be peacefulness that accounts for our effect, or a variety of other reasons not explored in this paper. Moreover, as no correlations were found between the pro-environmental survey answers (care for environmental initiatives and sustainable behaviours) and the conditions, it can be assumed that all conditions had participants with similar baselines on these measures. As this study utilised self selection, this helps to rule out the possibility that our participants in Triumpf park were simply people who had higher levels of care and actions towards environmental initiatives than those in our other conditions. Thus, the differences observed in petition signing must be due to factors beyond these specific self selection issues.

Experimenter bias may have been a limitation with this design. Each experimenter could have been differently biased in who they approached. Participant behaviour may also have been differently biased based on which experimenter approached them. The conditions also present a number of confounds which could interfere with our interpretations of the results. Due to the lack of foot traffic in the 'natural' condition, experimenters were more liberal in who they approached. Instead of waiting for potential participants to take a seat, the experimenters had solicited participants that were passing through the area. Furthermore, outdoor conditions were conducted during good weather, while the indoor-urban condition was measured during a variety of weather conditions. As weather has previously been found to influence behaviour there is a possibility that had an influence on our results (Cunningham & Coll, 1979).

### **Recommendations**

Our exploratory results suggest that being environments perceived as natural, may have a positive effect on the likelihood one will sign a petition related to climate change. Our research is important, as it highlights the potential for identifying and exploring the specific mechanism behind why and how immediate environments affect the likelihood of pro-environmental behaviours, and how natural environments may have an affective quality on individual's pro-environmental behaviours. For the purpose of recruiting signatures for future petitions related to environmental issues, we recommend that petition canvassing be conducted in environments perceived as higher in overall naturalness such as parks or trails. However, more research is needed to corroborate these findings. Future studies could find environments that more saliently reflect naturalness and urbaness. As we were not able to draw conclusions in regards to our outdoor urban environment we suggest this study be replicated using more urban conditions such as downtown Vancouver. Furthermore, future research should focus on identifying the specific mechanisms underlying why immediate environments may have a positive effect on individual's pro-social environmental behaviours.

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Appendix

Figure A)

### Distribution of Gender

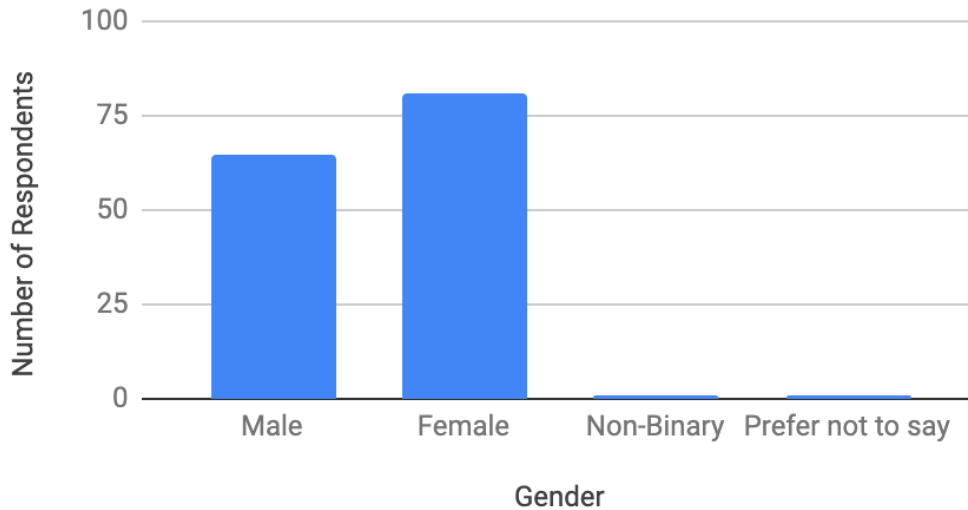


Figure A: Distribution of gender demographics across our study

Figure B)

### Distribution of Affiliations with UBC

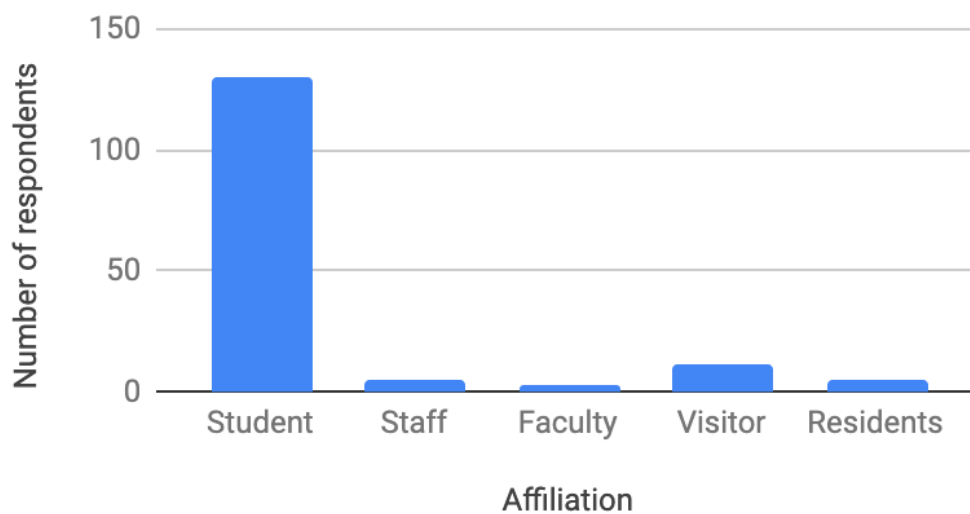


Figure B: Distribution of different affiliations with UBC reported by our participants

Figure C)

### Distribution of Student Year Levels

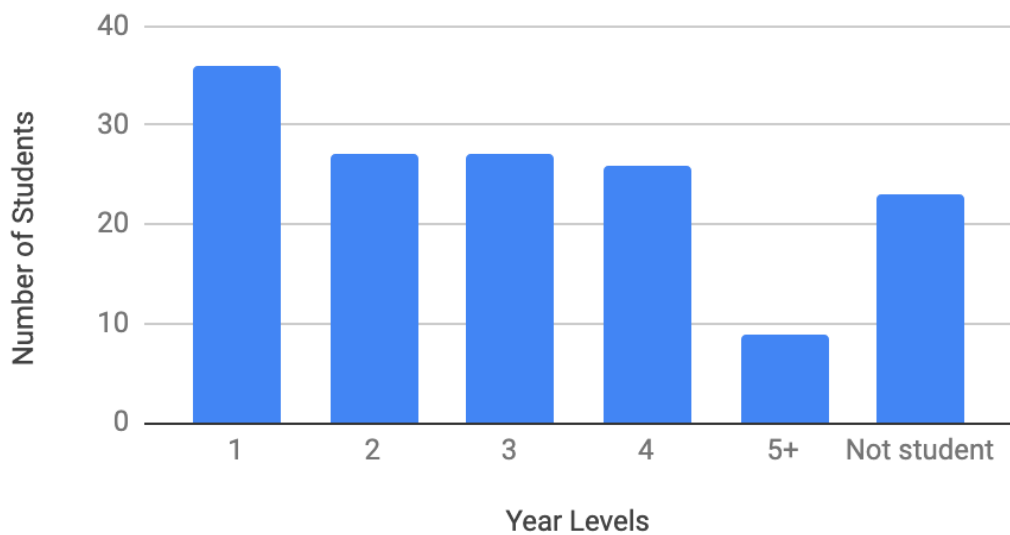


Figure C: Distribution of year levels for respondents who identified as students

Figure D)

### **Save Vancouver Island's Endangered Old-Growth Rainforest**

The science is clear: to sustainably manage coastal rainforests we must stop clearcutting endangered old-growth. B.C. needs a provincial *Old-Growth Protection Act* using elements of the celebrated Great Bear Rainforest Agreements combined with strong support for First Nations and good long term forestry jobs.

We also need an immediate halt to logging in critical intact old-growth hotspots. This will protect magnificent areas like the Central Walbran that are immediately threatened with destruction.

Taking these steps will help us to:

- Protect globally rare ecosystems, wildlife, water and climate
- Strengthen First Nations' governance and community well-being
- Transition from old-growth logging to sustainable second-growth forestry

BC's coastal temperate rainforests are among the rarest ecosystems on the planet, but today only 10% of Vancouver Island's biggest old-growth trees are left. Because of climate change, these forests will never grow back as we knew them—if we cut them, they'll be gone forever.

The NDP's 2017 election platform included a commitment to act for old-growth, promising to take "an evidence-based scientific approach and use the ecosystem-based management of the Great Bear Rainforest as a model." But so far the BC government has not yet taken any meaningful steps to protect endangered coastal and inland old-growth ecosystems outside the Great Bear Rainforest.

Please tell Forests Minister Doug Donaldson you support strong action to benefit BC's forests and communities.

Name \_\_\_\_\_

Email: \_\_\_\_\_

Street Address and Postal Code: \_\_\_\_\_

Figure D: Petition used in our study

How natural would you rate your immediate environment? (Not UBC as a whole)

Not at all 0 1 2 3 4 5 Very much



How peaceful would you rate your immediate environment? (Not UBC as a whole)

Not at all 0 1 2 3 4 5 Very much



Figure E)

How environmentally sustainable would you rate your day to day behaviours?

Not at all sustainable 0 1 2 3 4 5 Very sustainable



How much do you care about environmental initiatives?

Not at all 0 1 2 3 4 5 Very much





How much impact does climate change have on our environment?



Have you signed a petition for environmental reasons before?

- Yes
- No

What is your age?

What is your gender?

- Male
- Female
- Non-binary
- Prefer not to say
- Other

What is your affiliation with UBC? (Choose all that apply)

- Student
- Faculty
- Staff
- Visitor
- Other



If you are a student or faculty member, which department are you affiliated with?

- Department
- Not UBC student or Faculty member

If you are a student, what year are you in?

- 1
- 2
- 3
- 4
- 5+
- Not a UBC student



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*Figure E: Survey for our study*

Figure F)

| Results              |                   |                   |  |  |  |                          |
|----------------------|-------------------|-------------------|--|--|--|--------------------------|
|                      | yes               | no                |  |  |  | Row Totals               |
| fountain             | 35 (36.47) [0.06] | 17 (15.53) [0.14] |  |  |  | 52                       |
| life                 | 32 (35.77) [0.40] | 19 (15.23) [0.93] |  |  |  | 51                       |
| environment          | 41 (35.77) [0.77] | 10 (15.23) [1.80] |  |  |  | 51                       |
|                      |                   |                   |  |  |  |                          |
| <b>Column Totals</b> | 108               | 46                |  |  |  | <b>154 (Grand Total)</b> |

The chi-square statistic is 4.0894. The *p*-value is .129417. The result is *not* significant at *p* < .05.

*Figure F: Non-significant result found from a chi square of all three conditions*

Figure G)

| Results              |                   |                   |  |  |  |                          |
|----------------------|-------------------|-------------------|--|--|--|--------------------------|
|                      | yes               | NO                |  |  |  | Row Totals               |
| life                 | 32 (36.50) [0.55] | 19 (14.50) [1.40] |  |  |  | 51                       |
| environment          | 41 (36.50) [0.55] | 10 (14.50) [1.40] |  |  |  | 51                       |
|                      |                   |                   |  |  |  |                          |
|                      |                   |                   |  |  |  |                          |
| <b>Column Totals</b> | 73                | 29                |  |  |  | <b>102 (Grand Total)</b> |

The chi-square statistic is 3.9027. The  $p$ -value is .048209. The result is significant at  $p < .05$ .

Figure G: Significant chi square using Life and Triumph conditions

Figure H)

ANOVA – Perceived Naturalness of Environment ▼

| Cases                                      | Sum of Squares | df  | Mean Square | F     | p      |
|--|----------------|-----|-------------|-------|--------|
| Environment (1:Life, 2:Fountain, 3:Triumf) | 35.24          | 2   | 17.622      | 15.31 | < .001 |
| Residual                                   | 172.64         | 150 | 1.151       |       |        |

Note. Type III Sum of Squares

**Post Hoc Tests**

Post Hoc Comparisons – Environment (1:Life, 2:Fountain, 3:Triumf)

|   |   | Mean Difference | SE    | t      | Ptukey |
|---|---|-----------------|-------|--------|--------|
| 1 | 2 | -0.448          | 0.212 | -2.111 | 0.091  |
|   | 3 | -1.170          | 0.214 | -5.479 | < .001 |
| 2 | 3 | -0.721          | 0.211 | -3.412 | 0.002  |

Figure H: Anova and Post Hoc for perceived naturalness

Figure I)

ANOVA – Perceived Peacefulness of Environment

| Cases                                      | Sum of Squares | df  | Mean Square | F     | p     |
|--|----------------|-----|-------------|-------|-------|
| Environment (1:Life, 2:Fountain, 3:Triumf) | 11.95          | 2   | 5.973       | 4.538 | 0.012 |
| Residual                                   | 192.16         | 146 | 1.316       |       |       |

Note. Type III Sum of Squares

Post Hoc Tests ▼

Post Hoc Comparisons – Environment (1:Life, 2:Fountain, 3:Triumf) ▼

|   |   | Mean Difference | SE    | t      | Ptukey |
|---|---|-----------------|-------|--------|--------|
| 1 | 2 | -0.280          | 0.229 | -1.221 | 0.443  |
|   | 3 | -0.694          | 0.232 | -2.994 | 0.009  |
| 2 | 3 | -0.414          | 0.229 | -1.803 | 0.172  |

Figure I: Anova and Post Hoc for perceived peacefulness

Figure J)

ANOVA – Environmental Sustainability of Everyday Behaviours

| Cases                                      | Sum of Squares | df  | Mean Square | F     | p     |
|--|----------------|-----|-------------|-------|-------|
| Environment (1:Life, 2:Fountain, 3:Triumf) | 5.810          | 2   | 2.905       | 3.588 | 0.030 |
| Residual                                   | 120.657        | 149 | 0.810       |       |       |

Note. Type III Sum of Squares

Post Hoc Tests

Post Hoc Comparisons – Environment (1:Life, 2:Fountain, 3:Triumf)

|   |   | Mean Difference | SE    | t      | Ptukey |
|---|---|-----------------|-------|--------|--------|
| 1 | 2 | -0.008          | 0.178 | -0.043 | 0.999  |
|   | 3 | -0.420          | 0.180 | -2.334 | 0.054  |
| 2 | 3 | -0.412          | 0.178 | -2.313 | 0.057  |

Figure J: Anova and Post Hoc for environmental sustainability of everyday behaviors

Figure K)

ANOVA – Overall Concern for Environmental Initiatives

| Cases                                      | Sum of Squares | df  | Mean Square | F     | p     |
|--|----------------|-----|-------------|-------|-------|
| Environment (1:Life, 2:Fountain, 3:Triumf) | 3.466          | 2   | 1.733       | 1.919 | 0.150 |
| Residual                                   | 135.449        | 150 | 0.903       |       |       |

Note. Type III Sum of Squares

**Post Hoc Tests**

Post Hoc Comparisons – Environment (1:Life, 2:Fountain, 3:Triumf)

|   |   | Mean Difference | SE    | t      | Ptukey |
|---|---|-----------------|-------|--------|--------|
| 1 | 2 | -0.113          | 0.188 | -0.601 | 0.820  |
|   | 3 | -0.362          | 0.189 | -1.912 | 0.139  |
| 2 | 3 | -0.248          | 0.187 | -1.327 | 0.383  |

Figure K: Anova and Post Hoc for overall concern for environmental initiatives

Figure L)

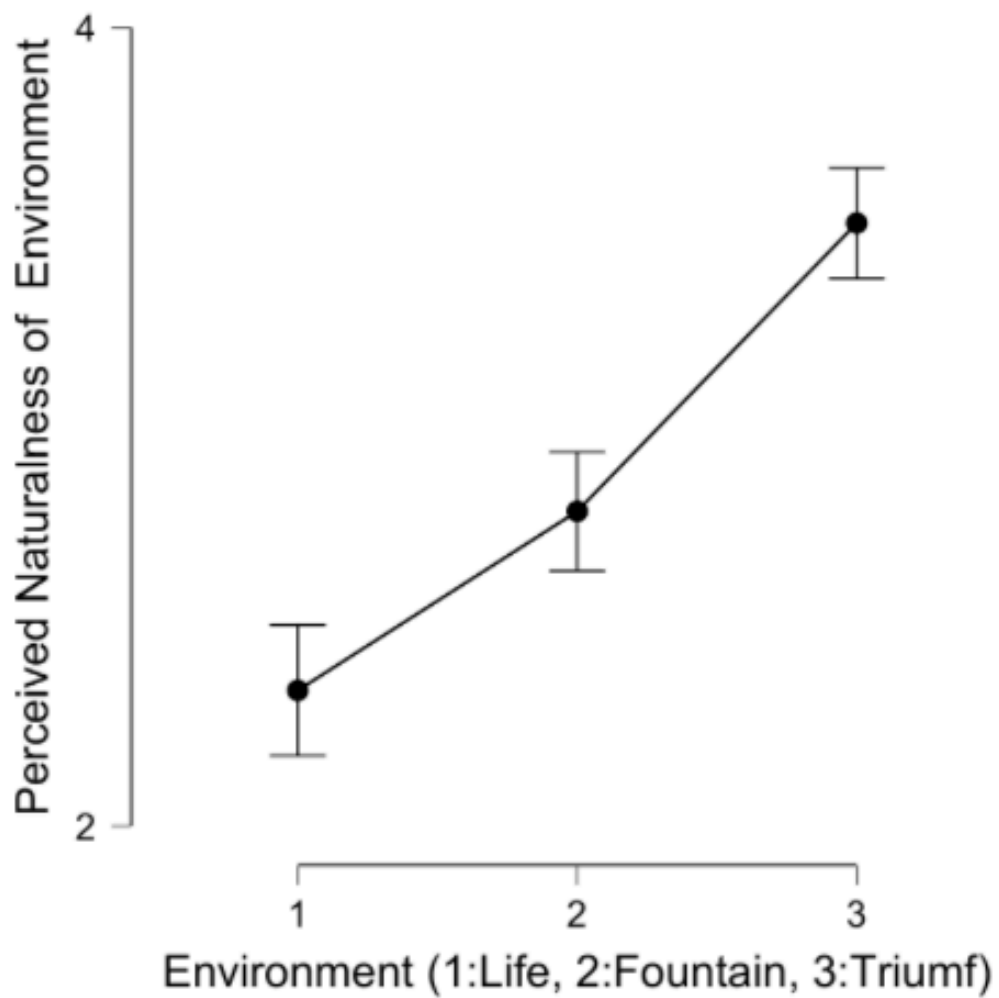


Figure L: Graph demonstrating that the fountain condition was rated in the middle in perceived naturalness